

Applicant Remarks

1. Applicant has amended paragraphs 66 and 76 to respond to the Office objection to FIGS. 5 and 9. The paragraphs now include the omitted reference numbers that are shown in the figures. Therefore, no drawing corrections are submitted. Entry of these two amendments is respectfully requested.
2. Applicant has amended paragraph 27 to clarify the definition of the term “string.” This definition is clearly supported by original paragraph 27. Entry of this amendment is respectfully requested.
3. Applicant respectfully transverses 35 U.S.C. 103(a) rejection of claim 1 as being unpatentable over Lysen (5,430,539) in view of Wick (6,580,519).
 - a. Applicant submits that it is not possible to combine the references as suggested by the Office.

Lysen specifically teaches the use of a measuring *plane* (col 1, line 59-60), not a reference wire or rope, i.e. *line*, as mentioned by Wick (col 1, line 29). A combination of the two references would mean that Lysen’s measuring plane must be defined by a line. This is not geometrically possible.

Applicant submits that the Office has misidentified Lysen’s measuring *plane* as a reference *line* in the 12/02/05 office action (page 3, 1st paragraph).

Lysen does mention a reference line (reference axis Z, FIG. 5), but the reference line is a computational abstraction, based on the desired orientation of the rolls being measured. It is not physically represented by a string or wire. Nor are any direct measurements made between the rolls and the Z axis.

Lysen requires the use of at least three fixed position electronic detectors (claim 1) to measure the axis. This agrees with the use of a measuring plane described in the specification (col 1, line 59-60), as it is well known that three points in space geometrically define a plane. Lysen does not teach the use of only two electronic detectors.

Finally, it is not possible to replace Lysen's measuring **plane** with a reference **line** because the electronic position detectors are positioned radially and at a "mutual spacing" and "same radial spacing" (col 2, line 26 and col 2, lines 59-60) around the rotating axis. The detectors do not line up in a straight line.

- b. Applicant submits that a combination of Lysen and Wick is not operable.

Even if it were possible to modify Lysen by replacing the plane with a line as mentioned by Wick, there is insufficient disclosure of Lysen's computational and measuring methods to adapt to a measurement of the rotating light beam against the reference line. Lysen teaches a method of determining the orientation angle of a roll by using a light beam attached to the end of a roll or to a fixture attached to the roll (FIGS. 1-10), at least three fixed position electronic detectors (claim 1), and solving "... a linear equation system with a number of equations corresponding to the number of unknown magnitudes which are sought, ..." (col 3, lines 40-42). To define the position of an axis in three dimensional space, it is well known that it would require locating two points in space. Therefore, at least six variables must be determined. Lysen must require that at least six simultaneous equations are solved simultaneously. There is insufficient disclosure of the computational method by Lysen to determine how a reference line replacing the reference plane could possibly be accommodated. It would

not be apparent, to one skilled in the art, on how to make the computation from a combination of the disclosures by Lysen and Wick.

In contrast, applicant's computational method directly measures the orientation angle between the rotating axis and the reference without the need to completely define the rotating axis position in space.

- c. Applicant submits that the combination of references do not show every element of applicant's currently amended claim 1.
 - i) Applicant has amended claim 1 to further clarify that the angular orientation measurement is a perpendicular measurement between the rotating axis and the reference string. Claim 1 now includes the adjective 'perpendicular' to describe the orientation angle.

In contrast, the teachings of Wick (col 1, line 29) can only be interpreted by the use of a wire or rope that is in a parallel orientation to the roll surface (i.e. parallel to the rotating axis), not perpendicular to the roll rotating axis.

Applicant does not teach or claim a method of measuring the distance between the reference string and the surface of the roll as mentioned by Wick.

- ii) Applicant's claim 1 specifically measures the minimum distance between the collimated light and the reference string at two or more locations. Both Lysen and Wick disclose the use of a light beam and multiple electronic detector positions to measure the position of the light beam in a measuring plane. The method of measuring the minimum distance between the light and a reference string as claimed by applicant is not taught or disclosed by Lysen and Wick, or by a combination of the two.

d. Applicant submits that each of the inventions disclosed by Lysen and Wick is completely operable within itself and that there is no motivation or suggestion within the references for the combination. Nor would one skilled in the art be motivated to combine the references. Wick only briefly mentions that a laser, wire, or rope may define a reference line useful for measuring alignment in the background section of the specification. Otherwise both Lysen and Wick teach other methods of measuring the orientation of a roll which include the use of a laser in combination with electronic position detectors. Applicant submits that Lysen's invention and Wick's invention, as disclosed and claimed, are both intricately described and adapted to their specific disclosures, adapted to their specific measurement geometry, adapted to their particular arrangement of electronic position detectors, and adapted to their specific computational methods. Each of the two inventions, as taught and claimed, take a unique path to measurement of the angular orientation of a roll. Applicant submits that each invention should be narrowly interpreted.

e. For the reasons given in 3a – 3d, applicant submits that a *prima facie* case of obviousness has not been established and respectfully requests withdrawal of the 35 U.S.C Section 103(a) obviousness rejection of claim 1.

4. Applicant respectfully transverses 35 U.S.C. 103(a) rejection of claim 2 as being unpatentable over Lysen (5,430,539) in view of Wick (6,580,519).

- a. Applicant reiterates the remarks already made in 3a-3e as claim 2 is dependent upon claim 1.
- b. Applicant submits that a combination of Lysen and Wick do not show an important and distinguishing feature of dependent claim 2.

Lysen shows a base which attaches the light source to the rotating axis by a base that **rotates with** the collimated light beam (FIGS. 1, 6-10). Applicant's base **does not rotate** with the collimated light beam. Rather, applicant's base is a portable base that defines other surfaces in reference to the rotational axis of claim 1. To further distinguish and clarify applicant's claim 2 over Office cited art, applicant has amended claim 2 to describe the base as fixed in relation to the rotating axis and as a portable base.

Applicant submits that a *prima facie* case of obviousness is not established for amended claim 2, and respectfully requests withdrawal of the 35 U.S.C Section 103(a) obviousness rejection of claim 2.

5. Applicant respectfully transverses 35 U.S.C. 103(a) rejection of claim 7 as being unpatentable over Lysen (5,430,539) in view of Wick (6,580,519).

a. The 12-2-05 Office Action states that "Lysen shows a collimated light source that is movable substantially perpendicular to said reference line and said movement is measured relative to said mounting base (figure1 and figures 6-10)." Applicant submits that this statement is inaccurate. In col 2, lines 32-40, Lysen describes the use of an attachment device which will i) rigidly attach the beam transmitter to the roller or ii) allow the beam transmitter to rotate independently of the roller. The attachment device is not configured to allow motion of the beam transmitter substantially parallel to the rotating axis. Lysen discloses "...beam transmitter 3 rigidly fastened thereto..." (Col 2, lines 34-35). All of the FIGS. 1, 6-10, show the beam transmitter as a rigid attachment to the roller without moving substantially parallel to the roller axis. There

is no mention of linear motion anywhere in Lysen, nor is there a description on how the motion relative to the attachment base would be measured.

Applicant notes that the small squares with an x filled in (FIGS. 7, 9, 10) would be interpreted as a fixed rotational bearing, not an allowance for linear motion. This interpretation would fit Lysen's description of the figures.

Applicant further notes that the parameters Z_1 and Z_{K1} in FIG. 5 establish the position of the beam transmitter along the roller axis. The beam transmitter position is not changed as part of the measurement method. FIGS. 6-10 show the beam transmitter position fixed along the roller axis. FIG. 2 clearly shows the beam transmitter position as fixed along the roller axis.

According to the teaching of Lysen, the exact position of the beam transmitter may vary in the direction parallel to the roller axis and the position is determined by the computational method (col 3, lines 7-9). Lysen does not teach or disclose a method of moving the beam transmitter parallel to the roll axis as part of the measuring method.

6. Applicant respectfully transverses 35 U.S.C. 103(a) rejection of claim 10 as being unpatentable over Lysen (5,430,539) in view of Wick (6,580,519).

- a. Applicant reiterates the remarks already made in 3a-3e as claim 10 is dependent upon claim 1.
- b. Applicant reiterates that a combination of Lysen and Wick do not show an important and distinguishing feature of dependent claim 10 as already stated for Claim 2 under item 4b.

Lysen shows a base which attaches the light source to the rotating axis by a base that ***rotates with*** the collimated light beam (FIGS. 1, 6-10). Applicant's base ***does not***

rotate with the collimated light beam. Rather, applicant's base is a portable base that defines other surfaces in reference to the rotational axis of claim 1. To further distinguish and clarify applicant's claim 10 over Office cited art, applicant has amended claim 10 to describe the base as fixed in relation to the rotating axis and as a portable base.

Applicant submits that a *prima facie* case of obviousness is not established for amended claim 10, and respectfully requests withdrawal of the 35 U.S.C Section 103(a) obviousness rejection of claim 10.

7. Applicant respectfully transverses 35 U.S.C. 103(a) rejection of claim 11 as being unpatentable over Lysen (5,430,539) in view of Wick (6,580,519). Applicant reiterates the remarks already made for claim 7 as follows.

- a. The 12-2-05 Office Action states that "Lysen shows a collimated light source that is movable substantially perpendicular to said reference line and said movement is measured relative to said mounting base (figure1 and figures 6-10)." Applicant submits that this statement is inaccurate. In col 2, lines 32-40, Lysen describes the use of an attachment device which will i) rigidly attach the beam transmitter to the roller or ii) allow the beam transmitter to rotate independently of the roller. The attachment device is not configured to allow motion of the beam transmitter substantially parallel to the rotating axis. Lysen discloses "...beam transmitter 3 rigidly fastened thereto..." (col 2, lines 34-35). All of the FIGS. 1, 6-10, show the beam transmitter as a rigid attachment to the roller without moving substantially parallel to the roller axis. There is no mention of linear motion anywhere in Lysen, nor is there a description on how the motion relative to the attachment base would be measured.

Applicant notes that the small squares with an x filled in (FIGS. 7, 9, 10) would be interpreted as a fixed rotational bearing, not an allowance for linear motion. This interpretation would fit Lysen's description of the figures.

Applicant further notes that the parameters Z_1 and Z_{K1} in FIG. 5 establish the position of the beam transmitter along the roller axis. The beam transmitter position is not changed as part of the measurement method. FIGS. 6-10 show the beam transmitter position fixed along the roller axis. FIG. 2 clearly shows the beam transmitter position as fixed along the roller axis.

According to the teaching of Lysen, the exact position of the beam transmitter may vary in the direction parallel to the roller axis and the position is determined by the computational method (col 3, lines 7-9). Lysen does not teach or disclose a method of moving the beam transmitter parallel to the roll axis as part of the measuring method.

Applicant submits that all matters in the Office action mailed on December 2, 2005 have been addressed and requests entry of the modifications and amendments. For all of the reasons given above, applicant respectfully submits that the errors in the specification are corrected, the claims comply with Section 112, the claims define the invention over the cited art under Section 103(a), and the claims are of patentable merit. Accordingly, applicant submits that this application is now in full condition for allowance, which action applicant respectfully requests.

If, after reviewing the above amendments and remarks, the Examiner has any questions, the Examiner is respectfully requested to contact me, by telephone, to discuss such issues or schedule an interview to address such issues.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark Loen".

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